

Serial No. 10/695,453
Docket No. T36-159874M/RS
(NGB.322)

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APPLICANT INITIATED INTERVIEW REQUEST

Applicant's representative respectfully requests a personal interview with Primary Examiner Alexander O. Williams in the above mentioned application in accordance with M.P.E.P. § 713.01(III), to discuss the Remarks set forth below, at the Examiner's earliest convenience.

Primary Examiner Williams kindly is requested to contact the undersigned attorney at the local telephone number listed below (or at Applicant's representative's direct number at 703-761-7623) to arrange for the personal interview at the Examiner's earliest convenience.

REMARKS

Entry of this Request for Reconsideration is proper because it does not raise any new issues requiring further search by the Examiner, narrows the issues on appeal, and is believed to place the present application in condition for immediate allowance.

Claims 1-3 and 7-23 are all the claims presently pending in the application.

Applicants gratefully acknowledge that claims 2 and 7-10 would be allowable if rewritten in independent form and that claims 11-23 have been allowed.

However, Applicants submit that all of the claims (i.e., claims 1-3 and 7-23) are allowable for the reasons set forth below.

No claim amendments have been made.

Claims 1 and 3 are the only claims rejected on prior art grounds.

Particularly, claims 1 and 3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nomoto (U.S. Patent No. 6,320,216 B1).

This rejection is respectfully traversed in the following discussion.

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I. THE CLAIMED INVENTION

In the conventional devices the contact resistivity of the electrode generally is high and it generally is impossible to obtain an ohmic junction when metal is formed simply on the semiconductor surface.

The claimed invention, on the other hand, solves the problems with the conventional devices by addressing the substance of the compound semiconductor/metal boundary and the relation with the metal boundary structure.

For example, in an exemplary aspect of the claimed invention, as defined for example, by independent claim 1, an electrode for a p-type Group III nitride compound semiconductor layer, including a film including polycrystalline metal, wherein the polycrystalline metal includes a transition metal.

Thus, the claimed invention provides an electrode having a lower contact resistance to p-type group III nitride compound semiconductor than conventional electrodes. Moreover, the electrical characteristics of the electrode according to the claimed invention are improved greatly (e.g., see Abstract).

The claimed invention also reduces the height of the Schottky barrier between the compound semiconductor and the metal by the strong orientation force of the metal, such that the value of contact resistance in the boundary between the p-type Group III nitride compound semiconductor and the metal can be reduced greatly (e.g., see specification at page 6, lines 12-18).

II. THE PRIOR ART REJECTION

Claims 1 and 3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nomoto.

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In the present Office action, the Examiner alleges that Nomoto teaches all of the features of the claimed invention (see Office Action at pages 3-6).

Applicants respectfully submit, however, that there are elements of the claimed invention which clearly are not disclosed or suggested by Nomoto. Therefore, Applicants traverse this rejection.

In the present Office Action, the Examiner recites several paragraphs of text taken from Nomoto, which describe the content of the "transition layers" 5a and 5b, as shown in Figures 11A and 11B. However, nowhere does Nomoto disclose or suggest that the "transition layers" 5a and 5b include a "*transition metal*", as recited in claim 1.

Indeed, Applicants respectfully note that the text of the Examiner's rejection includes the underlined words (e.g., transition, polycrystal, and electrode), which appear to have formed the Examiner's word search of the Nomoto reference.

However, Applicants respectfully submit that each occurrence of the term "transition" in Nomoto is not the same as, or used in the same context as, the claimed "*transition*" metal. That is, the "transition layers 5a and 5b" of Nomoto do not include a "*transition metal*", and thus, clearly are not comparable to the claimed "*transition metal*", as recited in claim 1.

Instead, Nomoto uses the term "transition" in a completely different context than the term "*transition*", as recited in the claimed "*transition metal*" of claim 1. Nomoto merely refers to layers that transition from one layer to another layer, not layers including a "*transition metal*", as claimed.

In comparison, independent claim 1 recites:

[a]n electrode of a p-type Group III nitride compound semiconductor light-emitting layer, comprising:

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*a film including a polycrystalline metal
wherein said polycrystalline metal comprises a transition metal*
(emphasis added).

That is, as clearly recited in independent claim 1, the electrode includes a polycrystalline metal film which includes a transition metal.

Applicants note that a “*transition metal*” ordinarily is defined as any one of a large group of elements (e.g., in the Periodic Table) in which the filling of the outermost electron shell to eight electrons is interrupted to bring the penultimate shell (which can be used in bonding) from eight to 18 or 32 electrons (see Chambers Dictionary of Science and Technology, © Chambers Harrap Publishers, Ltd. 1999). Applicants submit that the use of the term “*transition metal*” in the present application clearly is consistent with the ordinary definition (e.g., see specification at page 11, 22-25, and page 12, 1-5).

On the other hand, in Nomoto, the transition layers clearly do not include a “*transition metal*”, as claimed.

Thus, for at least this reason, Applicants submit that Nomoto clearly does not disclose or suggest all of the features of the claimed invention.

Moreover, the Examiner alleges that the polycrystalline metal including a transition metal would have been a matter of obvious design choice, and that the rejected claims merely involve using multiple pieces to replace a single piece (e.g., see Office Action at page 3, first paragraph, and page 6, third paragraph).

However, Applicants respectfully submit that the Examiner’s reliance on such legal principles and case law is misplaced, and indeed, inapplicable to the facts of the present application.

That is, as mentioned above, the claimed invention solves the problems with the

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conventional devices by addressing the substance of the compound semiconductor/metal boundary and the relation with the metal boundary structure. For example, in an exemplary aspect of the claimed invention, as defined for example, by independent claim 1, an electrode for a p-type Group III nitride compound semiconductor layer includes a film including polycrystalline metal, which includes a *transition metal*.

Thus, the claimed invention provides an electrode having a lower contact resistance to p-type group III nitride compound semiconductor than conventional electrodes. Moreover, the electrical characteristics of the electrode according to the claimed invention are improved greatly (e.g., see Abstract). The claimed invention also reduces the height of the Schottky barrier between the compound semiconductor and the metal by the strong orientation force of the metal, such that the value of contact resistance in the boundary between the p-type Group III nitride compound semiconductor and the metal can be reduced greatly (e.g., see specification at page 6, lines 12-18).

Thus, the claimed invention has nothing to do with “using multiple pieces to replace a single piece”, as alleged by the Examiner. Further, the claimed polycrystalline metal including a *transition metal* clearly would not have been a matter of obvious design choice, nor has the Examiner established that such would have been the case.

In fact, the Examiner has not established any basis for such assertions of “obvious matter of design choice”, and/or “using multiple pieces to replace a single piece.”

Applicants respectfully submits that such assertions properly should have been supported by explaining *how* or *why* the claimed invention would be deemed to be a matter of obvious design choice, and *how* or *why* claims 1 and 3 would be deemed to merely involve using multiple pieces to replace a single piece.

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For the foregoing reasons, Nomoto clearly does not disclose or suggest all of the features of independent claim 1 (and dependent claim 3). Accordingly, Nomoto clearly does not render obvious all of the features of independent claim 1 (and dependent claim 3).

The Examiner respectfully is requested to reconsider and withdraw this rejection and to permit claims 1 and 3 to pass to immediate allowance.

III. CONCLUSION

In view of the foregoing, Applicant submits that claims 1-3 and 7-23, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.


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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,


Date: October 6, 2005


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CERTIFICATE OF TRANSMISSION

I certify that I transmitted via facsimile to (571) 273-8300 the enclosed Request for Reconsideration under 37 C.F.R. § 1.116 to Primary Examiner Alexander O. Williams, Art Unit 2826 on October 6, 2005.


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